Congenital Malformation - Scope of the Problem

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Congenital Malformation - Scope of the Problem

- About 20-25% of perinatal deaths are due to lethal malformations
- birthweight 500-1500 grams - 10%
- birthweight > 1500g - 50%

Causes of Malformations

- Multifactorial - 20%
- Single-gene - 7.5%
- Chromosomal - 6%
- Infection - 2-3%
- Maternal diabetes - 1.5%
- Maternal medication - 1-2%
- Unknown - >50%

Incidence of Malformation according to birth outcome

- Livebirths - 2.5% (74% of total)
- Stillbirths - 7% (2.5% of total)
- TABs - 9% (16.5% of total)
- SABs -12% (7.4% of total)
- Overall -3%

N=8040 Brigham and Womens Hosp, 12 months

Definitions

- Malformation
- Malformation sequence
- Deformation
- Disruption
- Deformation sequence

Definitions

- Major malformation
- Minor malformation
- Syndrome
- Association
- Non-specificity of malformations

Malformation

- Morphologic defect of an organ or region due to an intrinsically abnormal developmental process (e.g. hypoplasia, incomplete closure, incomplete separation)

Malformation Sequence

- Multiple defects derived from a single known or presumed structural defect
- Examples:
  - meningomyeocele
    - club foot, hip dislocation, hydrocephalus
  - mandibular hypoplasia
    - cleft palate (Robin sequence)

Deformation

- Abnormal form or position of a body region caused by non-disruptive mechanical forces
- Examples:
  - clubfoot, congenital hip dislocation

Deformation Sequence

- Examples:
  - Intrauterine constraint
  - Robin sequence secondary to mandibular constraint

Disruption

- Morphologic defect of an organ or region resulting from a breakdown of, or interference with an originally normal developmental process

- example: Amniotic Band Disruption

Major Malformation

- Malformation of medical, surgical or cosmetic significance

Minor Malformation

- Minor morphologic features of little or no known medical significance
- found in less than 4% of population

Minor Variation

- “Normal” morphologic features representing variations of morphology, of no medical significance
- found in more than 4% of population

Association

- Non-random occurrence of several morphologic defects not identified as a sequence or syndrome

Syndrome

- From the Greek - “Running together”
- Multiple anomalies thought to be pathogenetically related, not representing a sequence

Non-Specificity of Malformations

- The same morphologic abnormality or pattern of anomalies may occur as
  - an isolated anomaly
  - a feature in a sequence, syndrome, or association
  - a feature in a chromosomal disorder, single-gene disorder or multifactorial disorder
- A feature in a teratogenic disorder

Goals of a rational clinical approach to a fetal & congenital malformation

- Accurate diagnosis
- Accurate prognosis
- Appropriate management of pregnancy
- Recognition of associated malformations and medical problems
- Prevention of complications
- Appropriate counseling for parents
- Prevention of recurrence by preventive measures and prenatal diagnosis

Management of newborn with malformation

- Avoid delivery room diagnosis
- Prompt, expert clinical evaluation
- Search for associated malformations
- Chromosomal studies
- Photographs
- Appropriate diagnostic studies

Management of newborn with malformation

- Explain concerns openly
- Emphasize the normal
- Humanize the abnormal
- Use precise diagnostic terms only when certain
- Don’t offer extensive differential diagnosis
- Careful prognostication

Suggestions for pregnancy management

- Assess every pregnancy for risk of malformation
- Previous child or family history of malformation or chromosomal disorder
- History of recurrent pregnancy loss
- Intrauterine growth restriction
- Olighydramnios or polyhydramnios

Suggestions for pregnancy management

- Appropriate diagnostic studies and clinical genetics consultation
- Evaluate for associated malformation
  - Think chromosomes!!
- Careful presentation of diagnostic and prognostic issues to the parents
- Consider referral to pediatric sub-specialist for provision of detailed diagnostic and prognostic information
- Utilize routine ultrasound study to screen for fetal malformation

Suggestions for management of fatal malformation in the fetus or newborn

- Careful and expert clinical examination
- Photographs
- Chromosomes (blood, viscera, skin)
- X-rays
- Pathologic examination
- Allow parents to see the child (naming, photographing, memorializing)
- refer for genetic counseling soon